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LINE OF GRANT PROPOSALS:

COMMENTS AND RECOMMENDATIONS OF THE FUND SECRETARIAT

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Introduction

1. The Fund Secretariat has conscientiously scrutinized the documents submitted by the World Bank to identify the relevant information which could lead to an assessment of the projects contained in the line of grant proposals. In so doing, The Fund Secretariat was mindful of the relevant decisions taken in the Fifth and Sixth Meetings of The Executive Committee. Comments have been prepared on all of the activities included where the level of information was enough to merit comment. It should be noted that the World Bank secured approvals from the would be beneficiary governments to submit these line of grant proposals.

2. This document contains general recommendations which should be taken into consideration for all proposed line of grant activities and recommendations on activities proposed for specific countries. The recommendations are based on the individual project evaluations which are included in this document.

General Recommendations

3. Full project documentation according to guidelines and procedures required by The Executive Committee for projects over \$500,000 must be submitted to The Executive Committee for activities approved through lines of grants by some specified time period to be determined by The Executive Committee (e.g., six to nine months after the line of grant approval).

4. Funding requests for activities involving transnational corporation subsidiaries, institutional strengthening, and public awareness should be deferred until decisions are made on the eligibility of these activities.

5. Approval is recommended for all eligible activities described herein at a total cost of approximately \$9.5 - \$12.7 million¹. Action on other activities identified in the line of grant requests should be deferred until such time as sufficient information is provided.

Recommendations by Country

Brazil (\$2.53 million)

6. "Installation of Low-Latitude Atmospheric Ozone Monitoring Stations" may not be eligible incremental costs.

¹ The range in total cost is due to two estimates for proposals from China.

7. Research and development on the viability of HFC-134a as a refrigerant for compressors is currently at advanced stages in several international research laboratories. The project proposed for additional basic research in this area would be redundant.

8. Approval is recommended for the \$2 million "CFC-12 Collection, Recycling, and Conservation Program for Household Refrigerator Maintenance and Repair Shops" project, however, more information should be provided as the project lacks significant quantitative information.

9. Approval is recommended for \$530,000 for the "Assembly Line Refitting for HFC-134a Refrigerator Compressor Production" project for existing production facilities.

China (\$4 to \$7.2 million)

10. All activities conform to project eligibility criteria.

11. However, double-counting should be avoided in the following projects:

- (a) Tianjin and Shanghai CFC to LPG conversion projects;
- (b) Beijing ABC Powder Production and Zhejiang Halon Extinguisher Conversion projects; and
- (c) Dalian Precision Parts Aqueous Cleaning Line and Dandong Electronic Tuner Aqueous Cleaning Line projects.

12. Approval is recommended for all eligible incremental costs which total \$4.0 million.², after accounting for the \$6 million which was previously approved by The Executive Committee at its Sixth Meeting.

Jordan (\$700,000)

13. The funding of \$700,000 for the "Deodorization of Liquified Petroleum Gas" project should be approved.

² The World Bank has proposed to cover either direct foreign exchange requirements or total incremental costs; whichever is the higher amount. If a decision were taken to cover the direct foreign exchange requirements, \$7.2 million would be required instead of the \$4 million recommended.

Thailand (\$500,000)

14. Due to the scarcity of information provided, only \$500,000 is recommended as start-up costs for the three identified projects. Full funding is deferred subject to submission of sufficient information.

15. There is insufficient information on the remaining projects included in this line of grant proposal on which to base any recommendation for funding at this time.

Tunisia (\$800,000)

16. Action on the project entitled "Engineering Assistance for the Design, Testing and Introduction of HFC-134a Technology in the Production of Domestic Refrigerators" should be deferred given the on-going research and development efforts considering the risks of conversion to HFC-134a.

17. Approval is recommended for \$100,000 for the combination of projects "Maintenance of Domestic Refrigerators" and "Maintenance of Commercial and Industrial Refrigerators". These projects also contain most of the elements of the project entitled, "Study on Service Sector and Potential for Recycling."

18. Approval is recommended for \$100,000 for the project entitled "Technical Seminar, Consultancies and Demonstration in the Flexible and Rigid Foam Sector".

19. Approval is recommended for the investment project component of the project entitled "Technical Seminars and Consultancies in the Aerosol Sector" in the amount of \$300,000.

20. Approval is recommended for the project entitled "Low-CFC and Non-CFC Rigid Foam" for \$300,000.

Turkey (\$965,000)

21. Action on the project "Substitution of CFC-12 by HFC-134a in Refrigeration Manufacturing" should be deferred given the on-going research and development efforts considering the risks of conversion to HFC-134a.

22. The project entitled "Fund Specific Demonstration Projects" should be included in the projects entitled "Recovery and Recycling of CFC-12 through a Network of Refrigeration Maintenance Shops" and "Other Investment Projects in Key ODS Using Sectors (Foams, Aerosols, Refrigeration Equipment, Solvents and Halons)".

23. Approval is recommended for \$65,000 for the project, "Implementation of Recovery and Recycling of CFC-12 at a Refrigeration Production Plant".

24. Approval is recommended for \$400,000 of the "Recovery and Recycling of CFC-12 through a Network of Refrigeration Maintenance Shops" project.

25. Approval is recommended for \$500,000 of the project entitled "Other Investment Projects in Key ODS Using Sectors (Foams, Aerosols, Refrigeration Equipment, Solvents and Halons)".

PROJECT EVALUATION SHEET

COUNTRY OR REGION: **BRAZIL**

PROJECT TITLE: **MP ODS Elimination Project**

BUDGET: **US\$ 8 Million (estimated)**

INCREMENTAL COSTS: **US\$ ND**

COST EFFECTIVENESS³: **\$ ND** per Kg ODP Saved Annually

PROJECT TIMEFRAME: START **NA** END **NA**

TECHNICAL REVIEW COMPLETED: YES **___** NO **X**

SECRETARIAT'S COMMENTS

The World Bank submitted the above project summary on 28 May 1992 for consideration of the Executive Committee at its seventh meeting. It is a request for a "grant fund" (line of grant) for financing of incremental costs of the following activities:

- Investments which result in the reduction (substitution) and elimination of ODS;
- CFC substituting applied research or process/product development technology;
- Training, technology dissemination and other activities of an educational nature;
- Technical assistance to the Inter-ministerial Technical Group (GTO) for country programme and sub-projects preparation;
- Other actions consistent with the Multilateral Fund.

The following seven sub-projects have been identified under the grant line:

1. **Installation of low-latitude atmospheric ozone monitoring stations**

Objective: Establish three Brewer-type monitoring stations in the tropical latitude to provide links to a worldwide ozone layer monitoring system.

Budget: US \$1.2 million.

Impact: Nil (no reduction on ODSs consumption)

³ Determined as the ratio of incremental costs to the estimated annual saving of ODP (\$/ODP _{Kg}).

2. CFC-12 collection, recycling, and conservation program for household refrigerator maintenance and repair shops

Objective: To provide authorized repair shops with equipment and training for collecting and recycling CFC-12 from household refrigerators and freezers being serviced. CFC-12 will be purified by Hoechst and resold at a reduced price. An initial pilot programme will be implemented to develop basic recovery data and to gain operating experience. A training component is included.

Budget: US \$2.0 million.

Impact: Not determined.

3. Assembly line refitting for HFC-134a refrigerator compressor production

Objective: Conversion of CFC-12 compressors to commercial scale production of HFC-134a, including some assembly line modifications (i.e., oil storage and filling equipment used for charging the compressors with ester oils).

Budget: US \$530,000.

Impact: Substitution of 3,750 to 5,000 tonnes of CFC-12 every year.

4. Assembly line refitting for HFC-134a refrigerator production

Objective: Modifications on the assembly line to substitute CFC-12 as refrigerant used in household refrigerators and freezers to HFC-134a, retaining conventional CFC-polyurethane foam panels.

Budget: Not determined.

Impact: Not determined.

5. Research and product development - compressors, rigid foams and refrigerators/freezers

Objective: Not determined.

Budget: Not determined.

Impact: Not determined.

6. Basic research - high efficiency compressors for use with HFC-134a

Objective: Basic research, by the Federal University of Santa Clara, in the area of impeller and mechanical design improvements for HFC-134a compressors.

Budget: US \$150,000.

Impact: Not determined.

7. Retrofitting of central chilling systems for conversion to HCFC-123 or HFC-134a refrigerants

Objective: Retrofit technology for converting CFC-11 central air conditioning and CFC-12 refrigeration systems to HCFC-123 and HFC-134a respectively.

Budget: Not determined.

Impact: Not determined.

The total cost of the sub-projects amount to US \$8.0 million; approximately 5,000 tonnes of CFC is expected to be annually phased-out when the sub-projects are fully implemented, as reported on the Project Cover Sheet prepared by the World Bank.

COMMENTS

1. The project document provides no detailed information on the technical and budgetary aspects of the individual sub-projects nor on the determination of incremental costs or cost-effectiveness. The Secretariat, based on the information provided, was unable to verify or deduce the estimates proposed in the project, either for the budget (US \$8.0 million) or for the amount of ODS estimated to be phased-out (5,000 tonnes/year).
2. Since costs for installation and operation of ozone monitoring stations are not included in the Indicative List of Categories of Incremental Costs, sub-project 1 for a total of US \$1.2 million, is not eligible for support from the Fund.
3. In estimating the incremental costs of sub-projects 3 and 4, and based on the information provided therein, it seems that when the projects are further developed, double counting could occur. In the future development of these sub-projects, an attempt should be made to avoid double counting of their incremental costs.
4. Project 2 lacks quantitative information.

PROJECT EVALUATION SHEET

COUNTRY OR REGION: PEOPLE'S REPUBLIC OF CHINA

PROJECT TITLE: ODS Phase Out (8 Projects)

BUDGET: US \$15.4 million

INCREMENTAL COSTS: US \$10 million

COST EFFECTIVENESS⁴: \$ 0.54 per Kg ODP Saved Annually

PROJECT DURATION: 3 years

TECHNICAL REVIEW COMPLETED: YES X NO

SECRETARIAT'S COMMENTS

The ODS Phase Out project consisting of nine projects⁵ was submitted for consideration of The Executive Committee at its Sixth Meeting. Advance disbursement of US \$6 million was authorized at the Sixth Meeting to allow for the commencement of these projects. The revised version of the project documentation now consists of eight projects.

The World Bank has proposed that the larger of the foreign exchange costs and the net incremental costs be funded. The requested funding is for US \$13.2 million, representing the foreign exchange costs, although the incremental cost is US \$10 million. However, the requested funding should be adjusted to reflect the US \$6 million already disbursed. Furthermore, the basis for the calculation of incremental cost is not provided. In the absence of sufficient incremental cost data, a decision to accept the World Bank's proposal will create problems related to policy issues.

The solvent projects (Dalian and Dandong) have been included in the UNDP Progress Report. If the Bank concurs, the requested funding should be adjusted accordingly.

All of the projects included in this request are eligible for Fund support and their implementation is estimated to result in the phase out of 16,200 tonnes of ODSs per year. Most of the projects are based on technology available outside of China and substantial technical support is being provided under the project.

⁴ Determined as the ratio of incremental costs to the estimated annual saving of ODP (\$/ODP_{kg}).

⁵ Refrigeration subproject (HCFC-22 compressor) was cancelled in the revised version.

However, it should be noted that the possibility of double-counting exists for some projects, for example:

- . Tianjin and Shanghai CFC to LPG conversion projects;
- . Beijing ABC Powder Production and Zhejiang Halon Extinguisher Conversion projects; and
- . Dalian Precision Parts Aqueous Cleaning Line and Dandong Electronic Tuner Aqueous Cleaning Line projects.

PROJECT EVALUATION SHEET

COUNTRY OR REGION: JORDAN

PROJECT TITLE: Technical Support and Investment Project for the Reduction of Consumption of Ozone Depleting Substances

BUDGET: US \$1.5 Million

INCREMENTAL COSTS: US \$1.5 Million

COST EFFECTIVENESS⁶: \$ ND per Kg ODP Saved Annually

PROJECT TIMEFRAME: START 1992 END 1995

TECHNICAL REVIEW COMPLETED: YES X NO

SECRETARIAT'S COMMENTS

The project has two components: (1) Technology Transfer and Technical Support, and (2) Technical and Organizational Assistance to Government's Institutional Strengthening Efforts. The first component focuses on the provision of assistance for technology transfer and development to the private sector and the second component will develop and enhance the key management systems required to fully support the phase-out. The incremental costs of the project are subdivided as follows: (A) Investment project on Deodorization of Liquified Petroleum Gas (LPG) of US \$0.7 million; (B) line of grant for private sector of US \$0.7 million; and (C) Policy and Monitoring Measures of US \$0.1 million.

Component 1: Technology Transfer and Technical Support

A. Deodorization of Liquified Petroleum Gas

Cost: US \$782,900

Impact: 200 tonnes ODS saved per year.

Comments: The objective of this project is to produce aerosol grade hydrocarbon to be used as a substitute propellant in two aerosol filling plants in Jordan. The LPG

⁶ Determined as the ratio of incremental costs to the estimated annual saving of ODP (\$/ODP_{kg}).

available in Jordan is of low quality. The project provides preparation of specification and design, technical support and consultation, procurement of equipment, training and safety measures. A full technical review and cost estimate are available. The project is well developed. The implementation of the project would lead to phasing-out of 200 tonnes of CFC each year.

B. Line-of-Grant for Private Sector

Cost: US \$700,000

Objective: Development of investment projects

Comments: Line-of-grant for ODS phase-out projects in other sectors outlines some potential areas of application of resources. The line-of-grant is estimated at US \$700,000 and subdivided by projects at costs in the range of US \$30,000 to US \$500,000.

- (i) It is planned to develop projects in the rigid foams sector with an emphasis on foam insulation used in the refrigerator manufacturing industry (three companies) and in commercial refrigeration (three companies).

Cost: Estimated at US \$120,000

Impact: The expected annual CFC reduction in 50 tonnes ODS.

- (ii) It is planned to develop specific projects in the flexible foam sector for five companies for total indicative costs of US \$30,000.

Cost: Estimated at US \$30,000

Impact: The expected annual CFC reduction is 120 tonnes ODS.

- (iii) It is planned to develop investment projects in air conditioning, commercial and domestic refrigeration.

Cost: Estimated at US \$500,000

Impact: The expected annual CFC reduction is up to 300 tonnes ODS.

- (iv) It is planned to design demonstration projects in the following areas:

- recycling and recovery of CFC-12 in the manufacture and maintenance of refrigeration equipment; and
- new recycling and maintenance procedure for halon system.

- Cost: The indicative budget for these two demonstration projects is US \$50,000.
- Impact: Confirmation of feasibility and cost effectiveness.
- Comments: The project documentation does not provide specific details concerning technologies involved and incremental costs of projects. Consequently, it is not possible to determine the viability and cost-effectiveness of any of the sub-projects.

Component 2: Technical and Organizational Assistance

C. Policy and Monitoring Measures

- Cost: The total cost of this project is US \$100,000.
- Objective: The project is designed to provide the funds on a grant basis. The project will be a part of a comprehensive action plan of the Government of Jordan covering technical and ozone awareness, monitoring, financing and institutional issues. The Ministry of Municipal/Rural Affairs and the Environment would act as a general administrator of the project and as a secretariat of the ODS Phase-out Committee.
- Comment: The Secretariat presented the document UNEP/OzL.Pro/ExCom/7/20 on the general guidelines in respect of institutional strengthening. The relevant Executive Committee's decision will apply.

PROJECT EVALUATION SHEET

COUNTRY OR REGION: THAILAND

PROJECT TITLE: ODS Investment Project

BUDGET: US \$16.8 million

INCREMENTAL COSTS: US \$11.0 million (estimated)

COST EFFECTIVENESS⁷: \$ Not determined per Kg ODP Saved Annually

PROJECT DURATION: 3 years

TECHNICAL REVIEW COMPLETED: YES NO X

SECRETARIAT'S COMMENTS

The World Bank submitted the above project for consideration of the Executive Committee at its seventh meeting. It is a request for a line of grant for financing of incremental costs of 20 investment sub-projects. The estimated sub-project cost is US \$16.8 million of which US \$11.0 million is considered as incremental cost. About US \$0.5 million is estimated for technical assistance (including purchase of computers), training and consultants. These estimates are based on the assumption that all Thai firms, including those owned by companies based in developed countries, are eligible for Fund grants.

The "Final Executive Project Summary" (FEPS), submitted by the Bank, provides a background on consumption of ODS and bilateral assistance being provided to transnational and national companies in the ODS phase out.

The Department of Industrial Works (DIW) will be the national implementing agency responsible for preparing the country programme and implementing the projects and the Industrial Finance Corporation of Thailand (IFCT) will be the financial intermediary.

Of the 20 investment sub-projects indicated in the FEPS, preliminary project summaries were prepared only for the following three sub-projects:

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Determined as the ratio of incremental costs to the estimated annual saving of ODP (\$/ODP_{kg}).

1. Automobile Air Conditioning (MAC) CFC Recycling

Objective: To recover and recycle of CFC-12 from automobile air conditioners. It will be carried-out in two phases: (i) training a core group of technicians; and installation of 50 CFC-12-recovery units, one centralized recycling station and integrated recovery recycling units; and (ii) establishment of a network of 150 recovery units in several shops.

Budget: US \$1.2 million, of which US \$0.9 million is incremental cost (figures to be confirmed).

Impact: 250 tonnes of CFC-12 per year.

2. Refrigeration CFC-12 Recovery and Recycling

Objective: To recover and recycle CFC-12 during servicing and repair of household refrigerators; training of service operators; and acquisition of 60 to 80 recovery/recycling equipment.

Budget: US \$0.5 million (to be confirmed).

Impact: 30 tonnes of CFC-12 per year.

3. Thai Airways Non-ODS Metal Cleaning

Objective: To phase-out CFC-113 and 1-1-1 trichloroethane in precision instrument and metal cleaning by Thai Airways by non-ODS technologies.

Budget: US \$100,000 (to be confirmed).

Impact: 5 tonnes of CFC-12 per year.

COMMENTS

1. The Secretariat, based on the information provided, was unable to verify or deduce the estimates proposed in the three sub-projects, either for their budget or for the amount of ODS estimated to be phased-out. Furthermore, preparation of sub-projects is incomplete: technologies (and/or substitutes) to be used are unspecified, budgets have to be confirmed, and incremental costs and project duration have to be determined.
2. Since there are several manufacturers of automotive refrigerant recovery, purification and recycling equipment on the market, a realistic budget of the MAC sub-project could be provided. Each machine is provided with a training manual, as well as a video cassette (20 minutes) and, therefore, no special training is required for the operation of this

equipment. Number of recycling and recovery units required and their location need to be clearly defined. Since the equipment can recover and recycle the refrigerant, the centralized recycling station may not be necessary.

3. Cost of recovering and recycling of CFC-12 in domestic refrigeration is higher (US \$144.2/kg) than the cost of conversion of the production from CFC-12 to HFC-134a (US \$20.74). Sub-project 2 should be further developed in light of its cost-effectiveness.
4. Since some refrigeration workshops may be dealing with both MACs as well as household refrigeration, the possibility of merging or articulating the two training sessions should be explored to save costs. Consequently the costs of the projects should be adjusted in order to avoid double counting.
5. Since recycling equipment is available on the market and experience is being gained in other countries, the lengthy procedures in developing such straightforward projects as recycling could be curtailed by transferring experience gained in the sector and involving local executing agencies from the onset in the project preparation. In particular, the experience gained with the MAC project in Malaysia (approved at the sixth meeting of the Executive Committee), should be taken into account.
6. While in 1991 US \$470,000 were allocated to the World Bank for engineering project in the solvent and MAC recycling sectors. However, no information on its relationship with the MAC and solvent sub-projects above-mentioned is provided.

PROJECT EVALUATION SHEET

COUNTRY OR REGION: TUNISIA

PROJECT TITLE: OZONE LAYER PROTECTION THROUGH
THE REDUCTION OF CONSUMPTION OF
OZONE DEPLETING SUBSTANCES

BUDGET: US \$2.20 million

INCREMENTAL COSTS: Estimated as 100% of the budget

COST EFFECTIVENESS⁸: \$ Not determined per Kg ODP Saved Annually

PROJECT DURATION: 3 years

TECHNICAL REVIEW COMPLETED: YES NO X

SECRETARIAT'S COMMENTS

The project proposal consists of 8 sub-projects, namely:

	<u>Project Cost</u>
(a) Engineering Assistance for the Design, Testing and Introduction of HFC-134a Technology in the Production of Domestic Refrigerators	\$360,000
(b) Introduction of Low-CFC and Non-CFC Rigid Foam	\$300,000
(c) Maintenance of Domestic Refrigerators	\$325,000
(d) Maintenance of Commercial & Industrial Refrigerators	\$185,000
(e) Technical Seminar, Consultancies and Demonstration in the Flexible and Rigid Foam Sector	\$100,000
(f) Technical Seminars and Consultancies in the Aerosol Sector	\$400,000
(g) Policy and Monitoring Measures	\$430,000
(h) Study on service sector and potential for recycling	\$100,000

Total: \$2,200,000

⁸ Determined as the ratio of incremental costs to the estimated annual saving of ODP (\$/ODP _{kg}).

(a) **Engineering Assistance for the Design, Testing and Introduction of HFC-134a Technology in the Production of Domestic Refrigerators**

Cost: \$360,000.

Objective: To introduce HFC-134a refrigeration technology. (R&D, Prototype Production, and Testing).

Impact: Not applicable.

Comments:

- The project carries some financial and technical risks in view of the fact that the technology of conversion from CFC-12 to HFC-134a is immature.
- It may be appropriate therefore to allow time for reconsideration of the project for improvement in its technical feasibility.

(b) **Introduction of Low-CFC and Non-CFC Rigid Foam**

Cost: \$300,000.

Objective: Stepwise conversion of the manufacture of refrigerator insulation foam to the use of non-CFC technology, i.e., use of: CO₂/water and 50% CFC-11; HCFC-22/142b or 100% CO₂/water.

Impact: 175 tonnes/year.

Comments:

- The stepwise approach proposed for the phase out of CFCs in the foam sector is appropriate.
- The proposal does not specify which of the substitutes would be used if HCFC-22/142b as a foaming agent is still being tested in developed countries.
- In view of the fact that the project will benefit other refrigeration sub-sector, it should be independent of the HFC-134a Refrigeration project.

(c) **Maintenance of Domestic Refrigerators**

Cost: \$325,000

Objective: Conservation of CFC-12 through recycling and by adopting nitrogen for flushing and purging. (Demonstration and training).

Impact: If successful, the demonstration project may lead to formulation of project on full scale recycling and CFC-12 conservation operations

Comments:

- The nature of recycling equipment on the market and the manufacturer prepared manuals and video films make heavy investments in consultancies and similar activities unjustifiable. Thus, training period alone according to this project design takes 3 years instead of possible 4-8 weeks. Consequently the cost of training of \$190,000 is not justified.
- The cost of miscellaneous items (\$60,000) in relation to cost of recycling machines (\$75,000) is unrealistic.

(d) **Maintenance of Commercial and Industrial Refrigerators**

Cost: \$185,000

Objective: Introduction of improved service practices, teaching retrofitting technology.

Impact: No immediate impact.

Comments:

- This project should be combined with project (c) above. Double counting can thus be avoided.

(e) **Technical Seminars, Consultancies and Demonstration in the Flexible and Rigid Foam Sector**

Cost: \$100,000

Objective: To introduce CFC-free technology while avoiding the option of methylene chloride (toxicity) in the flexible foam sector.

Impact: If this demonstration project succeeds, an investment project will follow which could eliminate approximately 400 tonnes/year of CFC-11.

Comments:

- The project is justifiable which would lead to formulation of investment projects on the basis of proven technologies. However, the estimated costs should be adjusted to account for the uncertainties associated with voluntary agreement conclusion and the number of participating firms.

(f) **Technical Seminars and Consultancies in the Aerosol Sector**

Cost: \$400,000

Objective: Conversion of existing aerosol facilities to CFC-free technology.

The project consists of acquisition of equipment and plant modification as well as technical assistance for training.

Impact: 230 tonnes/year CFC.

Comments:

- Preliminary estimates of cost of conversion seem reasonable.
- The training component (\$95,000) cannot be justified. The workshop on aerosols approved in the UNDP Work Programme for 1992 should satisfy this need.

(g) **Policy and Monitoring Measures**

Cost: \$430,000

Objective: To strengthen local institutions.

Impact: Not applicable.

Comments: The project has the following components:

. Creation of ODS Reduction Committee	\$ 60,000
. Monitoring System	\$ 30,000
. Regulatory measures	\$200,000
. ODS licence/accreditation of technicians	\$ 40,000
. Information Dissemination	\$ 50,000
. Financial flow mechanism	\$ 50,000

It is essentially an institutional strengthening activity and its consideration should be deferred pending a decision of the Executive Committee on institutional strengthening.

(h) **Study on service sector and potential for recycling**

Cost: \$100,000

Objective: To analyze the alternatives to determine the option for recycling.

Comments:

- Projects (c) and (d) contain all the elements under this study. Moreover the analysis of alternatives to determine the option for recycling will most likely be identified in the Country Programme.

PROJECT EVALUATION SHEET

COUNTRY OR REGION: TURKEY

PROJECT TITLE: Protection of the Ozone Layer through the Reduction of the Consumption of Ozone Depleting Substances

BUDGET: US \$8.28 Million

INCREMENTAL COSTS: US \$ (ND)

COST EFFECTIVENESS⁹: \$ ND per Kg. ODP Saved Annually

PROJECT TIMEFRAME: START 1992 END 1995

TECHNICAL REVIEW COMPLETED: YES ☒ NO ☐

SECRETARIAT'S COMMENTS

The project has two components: (1) Technology Transfer and Development Fund and (2) Institutional and Management Strengthening. The first component focuses on the provision of assistance for technology transfer and development in the private sector while the second component is aimed at the development and enhancement of management systems and public awareness required to support the phase-out.

Component 1: Technology Transfer and Development Fund

The funds will be channelled to private enterprises through a line-of-grant arrangement. The grant funds will be utilized to:

- I. Fund Specific Demonstration Projects - Project Cost US \$200,000
- II. Investment Projects
 - a. Substitution of CFC-12 by HFC-134a in refrigeration manufacturing \$4,652,000

⁹ Determined as the ratio of incremental costs to the estimated annual saving of ODP (\$/ODP₁₈).

- | | | |
|----|--|-------------|
| b. | Recovery and recycling of CFC-12 through a network of refrigeration maintenance shops | \$565,000 |
| c. | Implementation of recovery and recycling of CFC-12 at a refrigeration production plant | \$65,000 |
| d. | Other investment projects in key ODS using sectors (foams, aerosols, refrigeration equipment, solvents and halons) | \$2,500,000 |

Component 2: Institution and Management Strengthening

- | | | |
|----|---|-----------|
| a. | Management support through the service of international consultants, Turkish officials and industry leaders | \$300,000 |
| b. | Establishment of an ODS information system at the Ministry of Environment | \$100,000 |
| c. | Awareness campaign on television, in newspapers and newsletters | \$100,000 |

Total: \$8,282,000

Project I: Fund Specific Demonstration Projects

Cost: US \$200,000

Objective: Introduction of new technology.

Impact: Cannot be determined.

Comments: The introduction of new technologies will constitute an integral part of investment projects.

Project IIa: Substitution of CFC-12 by non-CFC substitutes in refrigeration manufacturing

Cost: US \$4,652,100

Objective: Engineering assistance and training for the design, testing and introduction of non-CFC technologies in the manufacturing of domestic refrigerators, including

motor/compressor, thermal foam insulation and refrigerant system.

Impact: Introduction of HFC-134a substitute technology in domestic refrigeration sector.

Comments: The substitution of CFC-12 with HFC-134a refrigerant should be separated from substitution of CFC-11 to non-CFC blowing agents in foam insulation, as recommended by the OORG expert.

According to the technical review of the OORG expert, the approval of the HFC-134a substitute project component would pose both financial and technical risks, since technology related to lubricants and reliability is still not completely mature. Tests of HFC-134a and ester based lubricants have been under way in developed countries for several years but have not yet been completed.

The candidate substitutes for foam insulation blowing are still under study in most developed countries. There are no definite options recommended. The project does not provide a specific option of a non-CFC blowing agent either. The choice of a new non-CFC composition for foam insulations requires serious consideration.

Transfer from CFC-12 to HFC-134a (mainly in domestic appliances) is one of the topics for which the OORG will develop further guidelines

Because of all these uncertainties, the consideration of the project may be deferred until the next meeting of the Executive Committee.

Project II b: Recovery and recycling of CFC-12 through a network of domestic refrigeration maintenance stages

Cost: US \$565,000.

Objective: To establish the network of recycling service shops in the metropolitan area of Istanbul operated by the Arcelik company.

Impact: Not identified. The project consist of two components: (1) Equipment - US \$332,970, and (2) Training, supervision, consultants - US \$232,000.

Comments: The OORG expert estimated the cost-effectiveness of the project at the very low level. On the basis of his recommendations, the scheme of application of recycling machines should be reconsidered in order to serve more consumers including the commercial refrigeration sector.

The training component should be substantially reduced taking into account that the companies supplying recycling machines provide the necessary training at a low cost.

Project II c: Recovery and Recycling of CFC-12 at a refrigeration production plant

Cost: US \$65,000.

Objective: To establish recovery/recycling system of refrigerator manufacturing plant.

Impact: Not identified.

Comments: According to technical review of the OORG expert, implementation of the project on recovery of CFC-12 in refrigerator manufacturing plants is feasible. However, the project description does not provide sufficient details concerning the incremental costs. The expected impact is not identified. Consequently, the cost-effectiveness of the project cannot be estimated.

Project II d: Other investment projects in key ODS using sectors (foams, aerosols, refrigeration equipment, solvents and halons)

Cost: US \$2,500,000.

Impact: Not determined.

Comments: The project description does not contain any details except names of potential companies-beneficiaries in refrigeration, flexible foams and aerosols sectors. The consumption in aerosols, foams (except refrigeration sector), and solvents sectors represents approximately 1,350 tonnes ODP. The investment projects based on proven cost-effective technologies (LPG in aerosols, non-CFC blowing agents in flexible foams, measures in electronic, metal, precision cleaning) may lead to substantial reduction in these sectors in the short-term and at relatively low cost. The project preparation in these sectors are of the highest priority and early actions should be initiated to this end.

Project III: Institution and Management Strengthening

- a) Management support through the service of international consultants, Turkish officials and industry leaders.

Cost: US \$300,000

- b) Establishment of an ODS information system at the Ministry of Environment.

Cost: US \$100,000

- c) Awareness Campaign on television, in newspapers and newsletters.

Cost: US \$100,000

Objective: Familiarize Turkish industry with ODS free technologies, handling procedures and cost implications. Develop and set-up a comprehensive system to monitor the consumption and uses of ODSs including a proposed licensing system for importers. Organize and conduct clearing house activities on new and emerging ODS-free technologies and processes. Enhance public awareness of the ozone issue.

Comments: Support for institutional strengthening activities in Turkey should be subject to the appropriate decision of the Executive Committee on agenda item 9. The Secretariat has prepared the discussion paper on this issue (UNEP/OzL.Pro/ExCom/7/20). The clearing house functions are UNEP's responsibilities.